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ELECTRICAL MEASUREMENT, SIGNAL PROCESSING, and DISPLAYS

ELECTRICAL MEASUREMENT, SIGNAL PROCESSING, and DISPLAYS

Edited by
JOHN G. WEBSTER



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Preface

Introduction

The purpose of *Electrical Measurement, Signal Processing, and Displays* is to provide a reference that is both concise and useful for engineers in industry, scientists, designers, managers, research personnel and students, as well as many others who have measurement problems. The book covers an extensive range of topics that comprise the subject of measurement, instrumentation, and sensors.

The book describes the use of instruments and techniques for practical measurements required in electrical measurements. It includes sensors, techniques, hardware, and software. It also includes information processing systems, automatic data acquisition, reduction and analysis and their incorporation for control purposes.

Chapters include descriptive information for professionals, students, and workers interested in measurement. Chapters include equations to assist engineers and scientists who seek to discover applications and solve problems that arise in fields not in their specialty. They include specialized information needed by informed specialists who seek to learn advanced applications of the subject, evaluative opinions, and possible areas for future study. Thus, *Electrical Measurement, Signal Processing, and Displays* serves the reference needs of the broadest group of users — from the advanced high school science student to industrial and university professionals.

Organization

The book is organized according to the measurement problem. [Section I](#) covers electromagnetic variables measurement such as voltage, current, and power. [Section II](#) covers signal processing such as amplifiers, filters, and compatibility. [Section III](#) covers displays such as cathode ray tubes, liquid crystals, and plasma displays.

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Editor-in-Chief

Editor-in-Chief

John G. Webster received the B.E.E. degree from Cornell University, Ithaca, NY, in 1953, and the M.S.E.E. and Ph.D. degrees from the University of Rochester, Rochester, NY, in 1965 and 1967, respectively.

He is Professor of Electrical and Computer Engineering at the University Wisconsin-Madison. In the field of medical instrumentation he teaches undergraduate and graduate courses, and does research on RF cardiac ablation and measurement of vigilance.

He is author of *Transducers and Sensors*, an IEEE/EAB Individual Learning Program (Piscataway, NJ: IEEE, 1989). He is co-author, with B. Jacobson, of *Medicine and Clinical Engineering* (Englewood Cliffs, NJ: Prentice-Hall, 1977), with R. Pallás-Areny, of *Sensors and Signal Conditioning* (New York: Wiley, 1991), and with R. Pallás-Areny, of *Analog Signal Conditioning* (New York: Wiley, 1999). He is editor of *Encyclopedia of Medical Devices and Instrumentation* (New York: Wiley, 1988), *Tactile Sensors for Robotics and Medicine* (New York: Wiley, 1988), *Electrical Impedance Tomography* (Bristol, UK: Adam Hilger, 1990), *Teaching Design in Electrical Engineering* (Piscataway, NJ: Educational Activities Board, IEEE, 1990), *Prevention of Pressure Sores: Engineering and Clinical Aspects* (Bristol, UK: Adam Hilger, 1991), *Design of Cardiac Pacemakers* (Piscataway, NJ: IEEE Press, 1995), *Design of Pulse Oximeters* (Bristol, UK: IOP Publishing, 1997), *Medical Instrumentation: Application and Design, Third Edition* (New York: Wiley, 1998), and *Encyclopedia of Electrical and Electronics Engineering* (New York, Wiley, 1999). He is co-editor, with A.M. Cook, of *Clinical Engineering: Principles and Practices* (Englewood Cliffs, NJ: Prentice-Hall, 1979) and *Therapeutic Medical Devices: Applications and Design* (Englewood Cliffs, NJ: Prentice-Hall, 1982), with W.J. Tompkins, of *Design of Microcomputer-Based Medical Instrumentation* (Englewood Cliffs, NJ: Prentice-Hall, 1981) and *Interfacing Sensors to the IBM PC* (Englewood Cliffs, NJ: Prentice-Hall, 1988), and with A.M. Cook, W.J. Tompkins, and G.C. Vanderheiden, *Electronic Devices for Rehabilitation* (London: Chapman & Hall, 1985).

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